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Electrochemical determination of synthetic antioxidants of bisdithiophosphonic acids

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Abstract

It has been found that bisdithiophosphonic acids with aryl substituents at the phosphorus atom quantitatively interact with electrogenerated halogens under the conditions of galvanostatic coulometry. Stoichiometric coefficients of the reaction between synthetic antioxidants and coulometric titrants-halogens have been determined. The corresponding reaction schemes have been proposed. The total antioxidant capacity (TAC) of the analytes has been estimated by their reaction with electrogenerated bromine. It has been demonstrated that bisdithiophosphonic acids bearing ionolic fragments demonstrate the highest TAC. It has been established that bisdithiophosphonic acids are irreversibly oxidized on a glassy carbon electrode at a potential of 800 mV with 0.1 M NaClO4 in acetonitrile as the supporting electrolyte. The quantification limit and the analytical range of the analyte determination have been found. © 2010 Pleiades Publishing, Ltd.

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Keywords

bisdithiophosphonic acids, electrochemical determination, synthetic antioxidants